

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A data processing apparatus comprising:

an instruction memory in which an instruction is stored;

a data memory in which data is stored;

an instruction decoder decoding a fetched instruction,

a memory operation unit coupled to said instruction memory, said data memory and said instruction decoder, fetching an instruction stored in said instruction memory, and accessing said data memory according to a decode result of said instruction decoder; and

an integer operation unit carrying out an integer operation according to a decode result of said instruction decoder,

said instruction memory including a plurality of instruction memory banks,

said memory operation unit generating a pipeline cycle corresponding to selection of an instruction memory bank to be accessed in a following pipeline cycle and a pipeline cycle corresponding to an access to an instruction memory bank without any accesses to other instruction memory banks to carry out low power consumption pipeline processing when a plurality of instructions are fetched from the plurality of instruction memory banks,

wherein:

said instruction memory further includes a high speed instruction memory, and

said memory operation unit generates a pipeline cycle corresponding to instruction readout to carry out a pipeline process when fetching an instruction from said high speed instruction memory, and performs a pipeline control having a same ~~throughout~~ throughput and a different latency compared to the access to said instruction memory when accessing to said high speed instruction memory.

2. (Original) The data processing apparatus according to claim 1, wherein said instruction memory further includes a first bank select circuit decoding an address including a low order address to generate chip select signals of said plurality of instruction memory banks so that a different instruction memory bank of said plurality of instruction memory banks is accessed when instructions at continuous addresses are accessed.

3. (Canceled)

4. (Previously Presented) The data processing apparatus according to claim 1, wherein said data memory includes a plurality of data memory banks, wherein said memory operation unit generates a pipeline cycle corresponding to selection of a data memory bank and a pipeline cycle corresponding to data access to carry out a pipeline process when accessing said plurality of data memory banks.

5. (Original) The data processing apparatus according to claim 4, wherein said data memory further includes a second bank select circuit decoding an address including a high order address to generate chip select signals of said plurality of data memory banks in order to divide said plurality of data memory banks into two different regions.

6. (Original) The data processing apparatus according to claim 5, wherein said second bank select circuit decodes an address including a low order address to generate chip select signals of said plurality of data memory banks so that a different data memory bank in said plurality of data memory banks is accessed when data at continuous addresses in said two different regions are accessed.

7. (Previously Presented) The data processing apparatus according to claim 4, wherein said data memory further includes a high speed data memory,

wherein said memory operation unit generates a pipeline cycle corresponding to data access to carry out a pipeline process when accessing said high speed data memory.

8. (Original) The data processing apparatus according to claim 1, wherein said memory operation unit fetches an instruction from said instruction memory via an instruction bus and accesses said data memory via a data bus differing from said instruction bus.

9. (Previously Presented) A data processing apparatus comprising:
an instruction memory in which an instruction is stored;
a data memory in which data is stored;
an instruction decoder decoding a fetched instruction;
a memory operation unit coupled to said instruction memory, said data memory and said instruction decoder, fetching an instruction stored in said instruction memory, and accessing said data memory according to a decoded result of said instruction decoder;

an integer operation unit carrying out an integer operation according to a decoded result of said instruction decoder;

wherein:

said instruction memory includes a plurality of instruction memory banks;

said memory operation unit generates a pipeline cycle corresponding to selection of an instruction memory bank to be accessed in a following pipeline cycle and a pipeline cycle corresponding to an access to an instruction memory bank without any accesses to other instruction memory banks to carry out a low power consumption pipeline processing when a plurality of instructions are fetched from the plurality of instruction memory banks; and

said memory operation unit reads out data from said data memory via a data input bus, and writes data into said data memory via a data output bus differing from said data input bus; and

said data memory and said integer operation unit are connected to said data input bus and said data output bus so as to perform an access to said data memory at high speed.

10. (Previously Presented) A data processing apparatus comprising:

an instruction memory in which an instruction is stored;

a data memory in which data is stored;

an instruction decoder decoding a fetched instruction;

a register file;

a memory operation unit coupled to said instruction memory, said data memory and said instruction decoder, fetching an instruction stored in said instruction memory, and accessing said data memory according to a decoded result of said instruction decoder; and

an integer operation unit carrying out an integer operation according to a decoded result of said instruction decoder,

said memory operation unit retaining an instruction in a loop of instructions corresponding to a repeat instruction in a dedicated register in said register file when said repeat instruction is executed, and executing the loop of instructions while fetching the instruction retained in said dedicated register;

wherein said memory operation unit generates a pipeline cycle corresponding to selection of an instruction memory bank to be accessed in a following pipeline cycle and a pipeline cycle corresponding to an access to an instruction memory bank without any accesses to other instruction memory banks to carry out a low power consumption pipeline process when fetching

an instruction from said plurality of instruction memory banks, wherein said register file comprises a processor status word,

wherein said memory operation unit:

refers to a first flag indicating a first execution cycle of said loop in said processor status word at the first execution cycle, and retains, in the register of said register file, the instruction in the loop of instructions fetched from said instruction memory when said repeat instruction is executed, and

refers to a second flag indicating a second execution cycle to a last execution cycle of said loop in said processor status word at the second execution cycle to the last execution cycle, and executes said loop while fetching the instruction retained in said dedicated register.

Claims 11 – 18 (Canceled).

19. (Original) The data processing apparatus according to claim 10, wherein said memory operation unit saves a plurality of registers including said dedicated register and switches a task in a task switch operation.